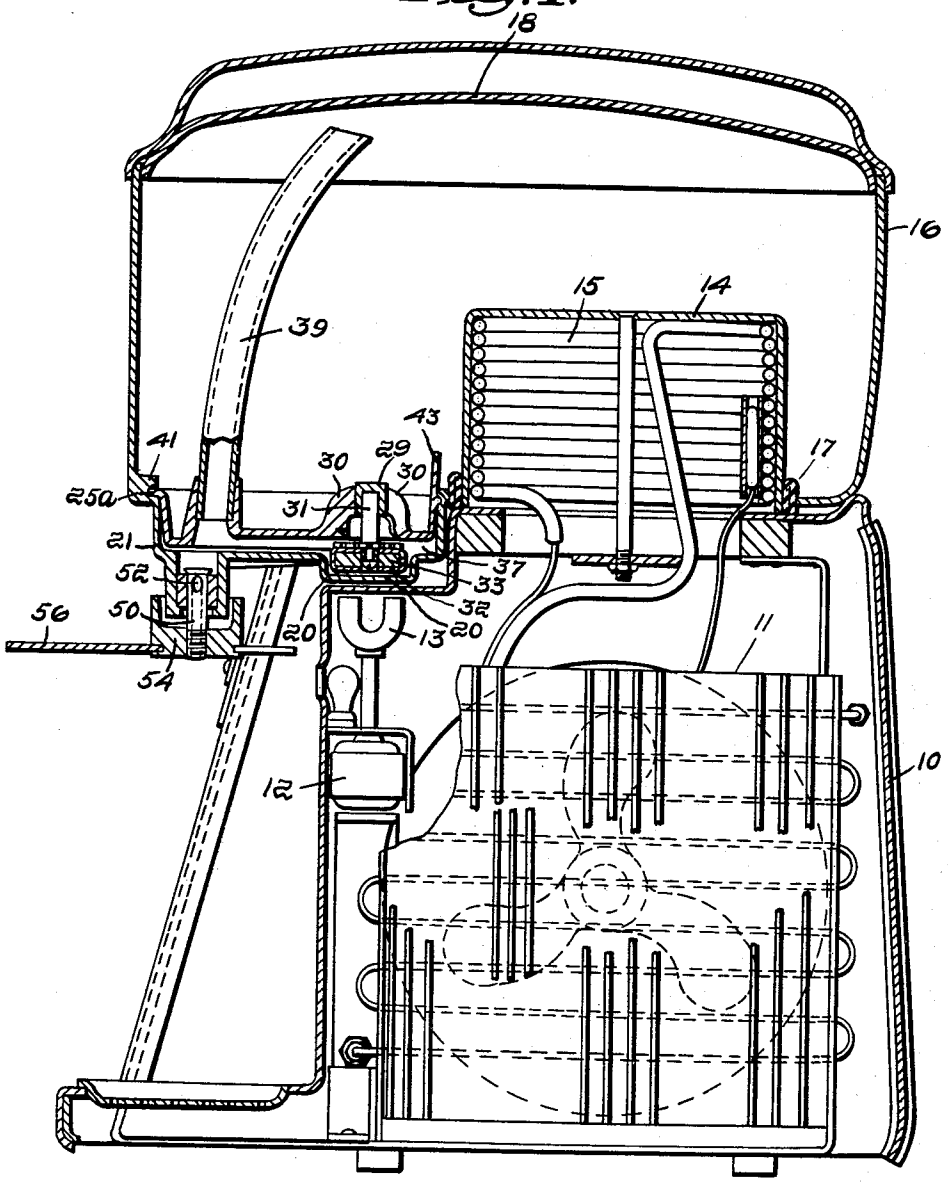
Jan. 28, 1964 W. H. JACOBS 3,119,531

CIRCULATING AND DISPENSING APPARATUS FOR BEVERAGE COOLERS

Filed Aug. 8, 1960

3 Sheets-Sheet 1

Fig. 1.



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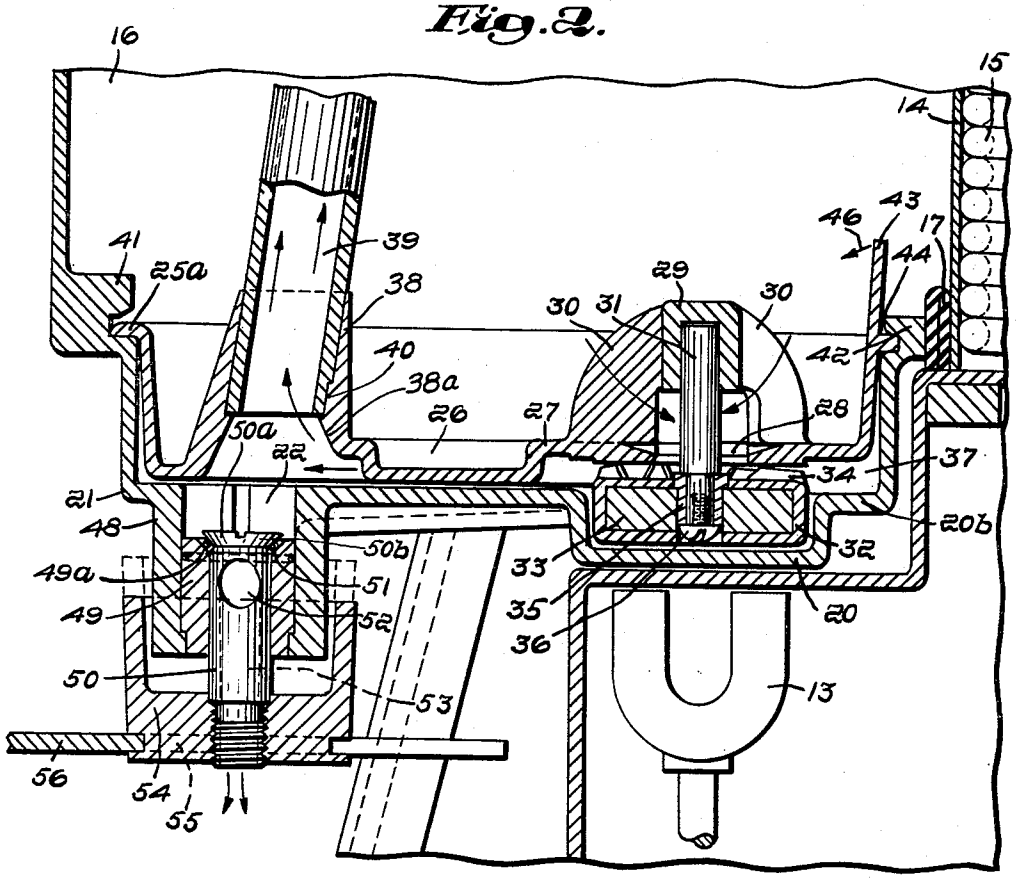
Filed Aug. 8, 1960 3 Sheets-Sheet 2

Fig. 2.



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Filed Aug. 8, 1960 3 Sheets-Sheet 3

Fig. 3.

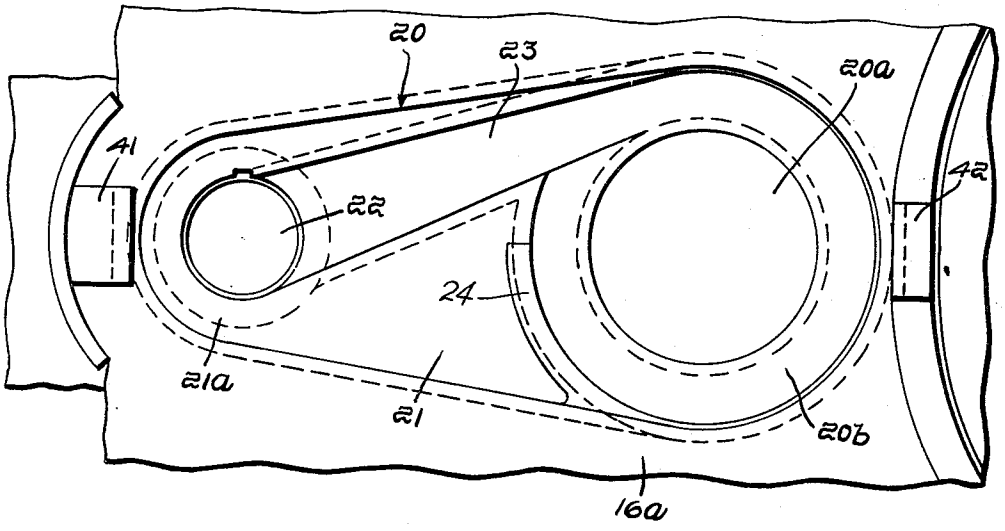
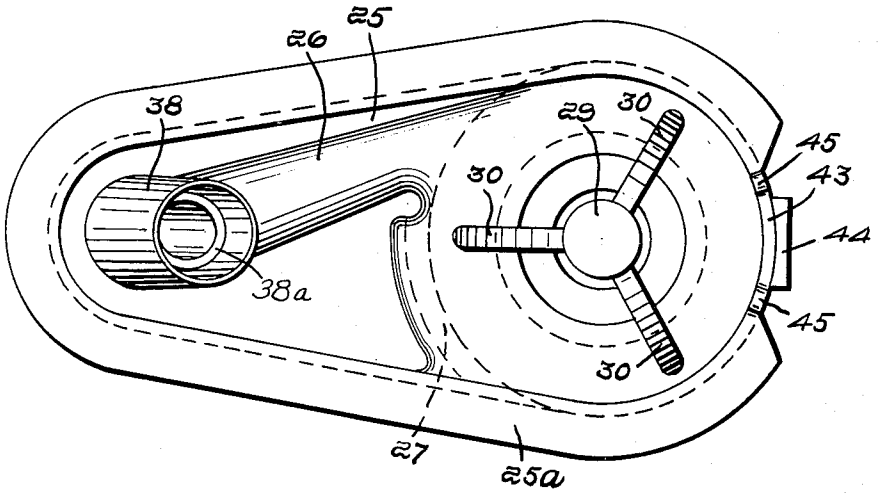


Fig. 4.



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3,119,531

CIRCULATING AND DISPENSING APPARATUS FOR BEVERAGE COOLERS

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4 Claims. (Cl. 222—318)

This invention relates to cooling and dispensing apparatus of the general type used in soda fountains, restaurants, and commercial institutions for storing and serving cold beverages.

The type of beverage dispenser in which this invention is intended to be used consists in general of a bowl mounted on a stand which houses refrigerating apparatus and a pump drive, a circulating system including a pump mounted within the bowl, and a dispensing valve for drawing liquid from the bowl. The pump or agitator is mounted in a well in the bowl and is magnetically coupled to the pump drive.

The general objects of this invention are to provide a construction in which the bowl and well may be readily molded in one piece and which permits full access to the interior of the well and circulation system for cleaning, to provide a pumping arrangement of maximum efficiency, and to provide a simple and efficient dispensing valve.

According to the invention here disclosed the bowl has a generally circular well molded in its bottom wall. A shallower depression, communicating with the well, and having a circular end portion in which an outlet opening is disposed, is also molded in the bottom of the bowl. A trough is formed in the depression, running from one side of the well to the outlet opening. The trough increases in width and depth toward the outlet. A cap made of somewhat flexible plastic fits into the depression and covers the well. The pump element and magnet are suspended from the cap concentrically in the well, and the cap carries a tubular projection, disposed over the outlet, in which the lower end of a removable standpipe is received. The cap has an inverted trough registering with the trough in the depression of the bowl to form a conduit leading from the well to the standpipe and the outlet opening. Other novel features and advantages of the invention will be apparent from the following detailed description.

In the drawings illustrating the invention:

FIG. 1 is a vertical cross-section through a beverage cooler equipped with a circulating and dispensing device constructed according to the invention;

FIG. 2 is an enlarged fragmentary vertical cross-section of the cooler taken in the region of the pump and valve;

FIG. 3 is an enlarged fragmentary plan view in the pump region showing the cover removed; and

FIG. 4 is a view similar to FIG. 3 but showing the cover in place.

A stand 10 houses a compressor 11 for a cooling system, a motor 12, and a drive magnet 13 mounted on the shaft of the motor. A cylindrical dome 14, in which refrigerating coils 15 are disposed, is mounted on the stand. A bowl 16 has a bottom opening through which the dome projects and a gasket 17 forms a seal between the bowl and the dome. The bowl has a removable cover 18.

The bowl is molded of material such as transparent plastic and has a generally circular well 20 molded in its bottom wall 16*a*. A depression, generally indicated by the numeral 21, somewhat shallower than the well, is also molded in the bottom wall of the bowl. This depression has a circular end portion 21*a* in which an outlet opening 22 is disposed, and the remainder of the depression is

shaped in plan outline like the common tangents of the circular portion and the well, so that the outline of the whole depressed area, including the well, resembles a segment of a pie in shape.

A trough 23, semi-circular in cross-section, formed in depression 21, leads from the well to the outlet opening. This trough is somewhat shallower than the central portion 20*a* of the well, and the well has a raised peripheral rim 20*b* at the level of the trough. The trough increases in diameter from the well toward the outlet opening. A ridge 24 is formed in depression 21 to one side of the trough.

The cap 25 has the same general configuration in plan as the depression and well, and fits into the two. The entire cap is molded in one piece from a plastic material which has a slight amount of flexibility. The cap has a rim 25*a* which extends beyond the sides of the depression and rests on the bottom wall 16*a* of the bowl. The cap has an inverted semi-circular trough 26 which registers with trough 23, and a groove 27 which engages ridge 24.

The cap has an opening 28 concentrically disposed above the well, and a stud 29 is supported above the opening by wings 30, all integrally formed with the cap. A shaft 31 is pressed into stud 29 and carries the magnetically driven impeller. The latter consists of a cylindrical casing 32, of inert plastic, surrounding a cylindrical magnet 33, and carrying vanes 34 on its upper surface. The impeller has a central bushing 35 rotatably received on the lower end of shaft 31 and secured by a screw 36. The cap and the peripheral rim 20*a* of the well form a ring-shaped pump chamber around vanes 34, communicating with the conduit formed by troughs 23 and 26.

Overlying opening 22 in the bowl is a tubular projection 38 formed in the cap. A standpipe 39, which extends upward into the bowl, is received in projection 38 and rests on a shoulder 38*a*. The projection carries an internal fin 40 which engages a groove in the standpipe for properly locating the latter.

To hold the cap in place, the bowl carries lugs 41 and 42 disposed near opposite ends of the cap. Lug 41 overhangs a portion of rim 25*a* when the cap is in place. The cap has an upstanding tab 43, carrying a rib 44 which engages under lug 42 when the cap is in place. Rim 25*a* is cut away along the larger end of the cap (the right-hand end as viewed in FIGS. 2 and 4), and the cap has slots 45 extending down somewhat below the level of rim 25*a* on either side of rib 44. As previously stated, the cap is made of somewhat flexible material. In addition, slots 45 provide a certain amount of freedom of movement of tab 43, so that the tab can be bent in the direction of arrow 46 to disengage rib 44 from lug 42. The right-hand end of the cap may then be lifted and rim 25*a* at the opposite end slid out from under lug 41. When the cap is removed, the entire area in the bowl which is normally covered by the cap is readily accessible for cleaning.

In the region of the outlet opening 22, the bowl has a tubular downward extension 48 in which a tubular valve casing 49, made of stainless steel or similar non-corrosive material, is mounted. A valve stem 50, of similar material, is slidably received in the valve casing. The stem has a head 50*a* with a bevelled under surface 50*b*. An O-ring 51 is mounted on the stem immediately below the surface 50*b*. Casing 49 has a bevelled seat surface 49*a* on which O-ring 51 normally seats under the weight of the stem.

Stem 50, which is solid at the top, has a transverse through opening 52 communicating with an interior bore 53 forming a passage leading out through the lower end of the stem. Threaded on to the lower end of the stem is a valve cup 54 having an external groove in which a

U-shaped flange **56** is slidably mounted. The valve cup and flange may be removed from the stem and taken apart for cleaning. The valve is operated by pressing an ordinary cup or glass, which is to be filled, against flange **56** and pushing the valve stem up until opening **52** is exposed above seat *49a*, allowing liquid from the conduit formed by troughs **23** and **26** to flow out through bore **53**.

When the dispenser is in operation the impeller assembly is magnetically coupled to the drive motor **12** by means of magnets **13** and **33**. The impeller is continuously rotated to draw liquid from the bowl into the pump chamber **37** through opening **28**, and discharge the liquid through the conduit formed by troughs **23** and **26**, and thence up through standpipe **39** into the upper part of the bowl. Continuous circulation of the liquid is thus maintained. When the valve is opened to draw off a portion of the beverage, some circulation continues through the standpipe, as access to the latter is not shut off by opening the valve.

The pump and circulation systems here described is inexpensive to manufacture, as the bowl and well may be molded in a single piece. The cap and impeller are easily removable as a unit for cleaning, leaving the well and adjoining parts of the bowl exposed and readily accessible. The diverging shape of the conduit formed by troughs **23** and **26** creates a venturi effect which produces maximum pumping efficiency, so that very little power is required to drive the impeller.

What is claimed is:

1. In a beverage dispenser: a storage bowl having a bottom wall, a segment-of-a-pie-shaped depression formed in said wall, said depression having a larger end portion in which a circular well is formed and a smaller end portion, said wall having an outlet opening in said smaller end portion and an open topped trough leading from said circular well to said outlet opening, a combined magnet and pump element unit disposed in said well, a drive element disposed outside said wall and magnetically coupled to said magnet and pump element unit, and a segment-of-a-pie-shaped cap coextensive with and removably fitting into said depression and secured in place therein and overlying said well, trough, and outlet opening, said cap having an inverted trough, mating with the trough in said wall and forming therewith a conduit.

2. Apparatus as described in claim 1, each of said troughs being semi-circular and increasing in width from said well to said outlet opening, said troughs forming a circular conduit.

3. Apparatus as described in claim 1, said cap having a flexible upright tab and a rib on said tab, and said wall having a projection overlying and engaging said rib to prevent upward movement of said cap, and said tab being bendable to disengage said rib from said projection.

4. Apparatus as described in claim 1, having a dispensing valve mounted in said outlet opening and a standpipe mounted on said cap, said conduit communicating both with said valve and with said standpipe.

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